THE CHI-SQUARED GOODNESS-OF-FIT TEST

TI-83 INSTRUCTIONS

VISIT...

A sample of 100 digits were randomly generated using a calculator random number generator. If the digits generated are random, we would expect that the outcomes could be modelled by a discrete uniform distribution. The following data were obtained:

Score (x)	0	1	2	3	4	5	6	7	8	9
Observed frequency (f_o)	10	17	13	7	15	3	8	12	6	9
Expected frequency (f_e)	10	10	10	10	10	10	10	10	10	10

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eps:

```
 CALC TESTS
Edit...
SortA(
SortD(
ClrList
SetUpEditor
```

```
      L2    L3    3
10    10
17    10
13    10
7     10
15    10
3     10
8     10
L3(1)=
```

Press **2nd** **QUIT** to finish editing the data.

Step 3: χ^2 is calculated using the following formula:

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

To calculate a sum press **2nd** **LIST** and use the ▶ key to select **MATH**, then select **5:sum(**.

Now press **(** **2nd** **L_1** **—** **2nd** **L_2** **)** **x^2** **÷** **2nd** **L_2** **)** **ENTER** to calculate χ^2.

```
NAMES OPS MATH
1:min(
2:max(
3:mean(
4:median(
5:sum(
6:prod(
7↓stdDev(
```

```
sum((L1-L2)²/L2)
                16.6
```

Step 4: The p-value is calculated using the formula:

$$1 - \chi^2\text{cdf}(0, \chi^2, \nu)$$

where ν, the degrees of freedom, in this example is 9.

Press **1** **—**.

Press **2nd** **DISTR** and choose **7:χ^2cdf(**.

Finish the formula by pressing **0** **,** **2nd** **ANS** **,** **9** **)** **ENTER**.

```
DISTR DRAW
2↑normalcdf(
3:invNorm(
4:tpdf(
5:tcdf(
6:χ²pdf(
7:χ²cdf(
8↓Fpdf(
```

```
sum((L1-L2)²/L2)
                16.6
1-χ²cdf(0,Ans,9)
        .0553610519
```

Since the p-value of 0.0554 is greater than 0.05, we do not reject H_0. Hence there is insufficient evidence to suggest that the calculator is not generating the digits randomly.

Warning: If $f_e < 5$, remember to combine classes.